

CLAIMS

1. Medical apparatus adapted for location at least partly within a body passage, the apparatus having a leading end and an area for access from the apparatus into the body passage, at least part of the area spaced from the leading end, and the apparatus being controllably movable between collapse and expansion positions, for expanding the body passage.

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2. Apparatus as claimed in claim 1, wherein the apparatus is adapted to be moved between the collapse and expansion positions in incremental steps.

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3. Apparatus as claimed in any preceding claim, wherein the apparatus is controllably movable between fully collapsed and fully expanded positions, and is adapted to be moved to a position between the fully collapsed and fully expanded positions.

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4. Apparatus as claimed in any preceding claim, wherein the apparatus is for use in transanal endoscopic microsurgery (TEM).

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5. Apparatus as claimed in any preceding claim, wherein the collapse position of the apparatus is a rest position and the expansion position is a stressed position, and wherein the apparatus is adapted to move to the collapse position in the absence of an applied expansion force.

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6. Apparatus as claimed in any one of claims 1 to 4, wherein the collapse position of the apparatus is a stressed position and the expansion position is a further stressed position, and wherein the apparatus is adapted

to move to the stressed position in the absence of an applied expansion force.

7. Apparatus as claimed in any one of claims 1 to 4,
5 wherein the collapse position of the apparatus is a stressed position and the expansion position is a rest position, and wherein the apparatus is adapted to move to the expansion position in the absence of an applied collapse force.

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8. Apparatus as claimed in any preceding claim, comprising an actuating device including an activating member adapted for moving the apparatus between the collapse and expansion positions.

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9. Apparatus as claimed in claim 8, wherein the activating member is moveable relative to a remainder of the apparatus.

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10. Apparatus as claimed in claim 9, wherein the actuating device comprises a screw mechanism including a screw threaded member coupled to the activating member, rotation of the screw threaded member adapted to move the activating member relative to a remainder of the apparatus, thereby moving the apparatus between the collapse and expansion positions.

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11. Apparatus as claimed in claim 9, wherein the actuating device comprises a ratchet mechanism including a slider coupled to the activating member and a locking member, movement of the slider relative to the locking member adapted to move the activating member relative to a remainder of the apparatus, thereby moving the apparatus between the collapse and expansion positions.

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12. Apparatus as claimed in any one of claims 8 to 11, wherein the actuating device comprises a motor for moving the activating member.

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13. Apparatus as claimed in any preceding claim, comprising a lock for locking the apparatus in a desired position.

10 14. Apparatus as claimed in any preceding claim, wherein the access area extends from the leading end and part way along a length of the apparatus.

15 15. Apparatus as claimed in any preceding claim, comprising a guide member, the guide member adapted for location at least partly within the body passage.

20 16. Apparatus as claimed in claim 15, wherein the guide member defines the leading end and the access area of the apparatus, and wherein said at least part of the access area is spaced from the leading end along a length of the guide member.

25 17. Apparatus as claimed in either of claims 15 or 16, wherein the access area is an aperture in a wall of the guide member.

30 18. Apparatus as claimed in any one of claims 15 to 17, wherein a distance between the access area and a trailing end of the guide member is minimised, to facilitate access through the opening.

19. Apparatus as claimed in any one of claims 15 to 18, wherein the access area is an elongate opening, of a

greater dimension in a direction along a main axis of the guide member than in a direction around a perimeter of the guide member.

5 20. Apparatus as claimed in any one of claims 15 to 19, wherein the access area is an opening extending around at least half of a perimeter of the guide member.

10 21. Apparatus as claimed in any preceding claim, including an inlet at a trailing end thereof for access into the apparatus and to the access area.

15 22. Apparatus as claimed in any preceding claim, comprising at least one expansion device moveable between collapse and expansion positions, for moving the apparatus between the corresponding collapse and expansion positions.

20 23. Apparatus as claimed in claim 22, wherein the expansion device is an elastically deformable expansion arm.

25 24. Apparatus as claimed in either of claims 22 or 23, wherein the expansion device is of a shape memory alloy.

25 25. Apparatus as claimed in claim 24, wherein the expansion device is adapted to be moved to the expansion position by heating the device above a transition temperature of the shape memory alloy.

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26. Apparatus as claimed in any one of claims 22 to 25, when dependent on claim 8, wherein the expansion device is movable to the expansion position in response to a force applied by the actuation device.

27. Apparatus as claimed in claim 22, wherein the expansion device comprises at least one inflatable element, adapted to be inflated to move the apparatus to
5 the expansion position.

28. Apparatus as claimed in claim 27, wherein the expansion device comprises a plurality of inflatable elements, the elements axially spaced with respect to a
10 main axis of the apparatus.

29. Apparatus as claimed in claim 22, comprising at least one elastically deformable expansion arm, and at least one inflatable element, whereby expansion of the
15 body passage is achieved through a combination of inflation of the inflatable element and deformation of the elastically deformable device.

30. Apparatus as claimed in claim 29, wherein the/each
20 elastically deformable expansion arm is coupled to a respective inflatable element.

31. Apparatus as claimed in claim 29, wherein the/each
25 expansion arm is coupled between at least two respective axially spaced inflatable elements.

32. Apparatus as claimed in any one of claims 22 to 31, when dependent on claim 15, comprising a flexible cover extending between the expansion device and the guide
30 member, for preventing any part of the body passage from damage during movement of the expansion device between the collapse and expansion positions.

33. Apparatus as claimed in any one of claims 22 to 32, wherein the expansion device provides a force-feedback to an operator during movement between the collapse and expansion positions.

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34. Apparatus as claimed in any one of claims 22 to 33, comprising a device for measuring an expansion force exerted on the body passage during movement of the apparatus between the collapse and expansion positions.

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35. A method of providing access to a body passage, the method comprising the steps of:

inserting a medical apparatus at least partly into a body passage with the apparatus in a collapse position;

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controllably moving the apparatus from the collapse position to an expansion position, to expand the body passage; and

20 accessing the body passage through an access area of the apparatus, at least part of the access area being spaced from a leading end of the apparatus.

36. A method as claimed in claim 35, comprising exerting an expansion force on the medical apparatus following insertion into the body passage, to move the apparatus to the expansion position.

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37. A method as claimed in claim 35, comprising exerting a collapse force on the medical apparatus, to move the apparatus to the collapse position and to restrain the apparatus in the collapse position for insertion into the body passage, and subsequently releasing the collapse force, whereupon the apparatus moves to the expansion position.

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38. A method as claimed in any one of claims 35 to 37, comprising controllably moving the apparatus from the expansion position to the collapse position and removing the apparatus from the body passage.

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39. A method as claimed in claim 38, further comprising rotating the apparatus relative to the body passage, reinserting the apparatus into the body passage and returning the apparatus to the expansion position.

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40. A method as claimed in any one of claims 35 to 37, comprising returning the apparatus to the collapse position, rotating the apparatus within the body passage, and then returning the apparatus to the expansion position.

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41. A method as claimed in any one of claims 35 to 40, comprising viewing the body passage through the access area.

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42. A method as claimed in any one of claims 35 to 41, comprising conducting a diagnostic procedure on the body passage.